1961

Papers Concerning Logan Water Works; Correspondence

Dean F. Peterson
Utah State University

Alvin A. Bishop
Utah State University

March 2, 1961

Mr. Ray C. Hugie,
City Engineer
Logan, Utah

Dear Ray:

In accordance with your request I have made a study of the capacity of the Logan City culinary water line in Logan City in relation to improvements made since 1915. The following information is presented.

In 1915, Logan City installed a wood stave pipe from the Dewitt Spring to the distribution reservoir consisting of the following:

643' - 24"
5257' - 22"
10300' - 18"
10128' - 16"

The 24" pipe connected the spring with a head house and measuring weir on the bank of Logan River. From this point, the 22" pipe conveyed the water to a point near the third dam, the 18" pipe and 16" pipe taking it the rest of the way to the reservoir. The available slope in the 22" pipe between the head house and the third dam ~~is~~ was only 2 ft. per 1000 ft. giving a capacity of ~~8.75~~ 9.30 cfs. From the third dam to the distribution reservoir the slope is much steeper, averaging 7.6 ft. per 100 ft., which with smaller pipes (18" and 16" combined) gives ~~the~~ about the same capacity, that is ~~8.75~~ 9.30 cfs.

In 1934 - 7,128 feet of the 16" pipe was replaced with 20" steel. This had the effect of reducing the friction losses in the line below the third dam and made the effective capacity of this section about 10 c.f.s. However, the system capacity remained at ~~8.75~~ 9.30 cfs since the 22" line could convey only this amount to the third dam. Likewise, the 1947 construction replacing the balance of the 16" wood stave with 24" steel did not increase the capacity beyond ~~8.75~~ 9.30 cfs, although the friction below the third dam was decreased to be below the pipe in the vicinity of the third dam with a capacity of about 13 c.f.s. as shown on the attached drawing. You will

In 1949, the balance of the wood stave pipe was replaced with concrete pipe. Between the spring and the third dam, 36" pipe was used for a distance of 5900 ft. and 10,440 ft. of 24" was used to connect to the steel pipe installed in 1947.

I recall that I made measurements of the spring and diversion by Logan City in the Spring of 1949 when we were making the design for the new pipe line. A copy of the measurements I made are attached which showed 13.61 cfs being diverted on May 6, 1949. These

(over)

The 1949 construction increased the capacity between the spring and the third dam to 33 c.f.s. and increased the capacity of the line below this point to 19.5 c.f.s.

In the near future when the 20" and 24" steel lines require replacement the capacity can be further increased. The 20" line will probably require replacement ~~soon~~, and if replaced with 30" pipe the capacity of the system will then be 27.5 cfs. Replacing the 24" steel line with 30" will further increase the capacity to an ultimate of 30 cfs.

A summary of the capacity of the water system in the canyon gives the following:

1915 to 1949	9.3 ~~8.75~~ cfs
1949 to present	19.5 cfs
When 20" steel is replaced with 30"	27.5 cfs
Ultimate capacity with 30" replacing 24" steel	30 cfs.

In making the above study I found it convenient to plot a profile of the entire system since the 1949 construction made substantial changes in the alignment and grade at several points. A print of the profile is enclosed for your information.

I hope the above information will provide you with the data you need to analyze and plan the water system.

Sincerely,

A. A. BISHOP
Hydraulic Engineer

1915 to 1934	9.3 cfs
1934 to 1947	10.0 "
1947 to 1949	13.5 "
1949 to Present	19.5 "
Near Future	27.5 "
Ultimate	30.0 "

Dean

March 27, 1961

Mr. Ray Hugie
City Engineer, Logan City
Logan, Utah

Dear Mr. Hugie:

As per your request we have made an investigation into the possibility of obtaining water from wells. Following is a report on this to date:

General

The situation with regard to underground water is more complicated and has already been further developed than we had originally thought. There are already an estimated two-hundred odd wells, all but about 25 are small domestic wells located in Logan City and immediately adjacent to the west. Fortunately these are shallow, 200 feet maximum and mostly of the order of 100 feet in depth. The State Engineer will not grant a permit to drill without hearings if we file for waters from these shallow aquifers. Advertising and hearings may take several months. Even if such permits were granted, we would then face litigation--a single disgruntled well owner could start it, and based on the recent Current Creek decision we would seriously risk our investment due to court injunction if we tapped these shallow aquifers in any case. Mr. Mayo of the State Engineer's Office feels we would be protected from interference possibilities if we tapped aquifers at depths of below 250 feet and believes an immediate permit may be issued to drill wells in such aquifers. There would seem to be no difficulty about making the exchange for canal water and changing the point of diversion to DeWitt Spring.

With this situation in mind Mr. Hugie, Mr. Eames and I tentatively chose locations for four wells. These are indicated on the attached map. Two would deliver water to the Logan and Northern Canal and two to the Hyde Park and Logan Northfields Canal. Because of the fact that no logs are available at these depths in this region, since dry holes were recently found both at North Logan and Richmond, and because of the greater investment required for the deeper wells, and since I am not a geologist, I consulted Dr. J. Stewart Williams, a professional geologist, who is both

well versed in the local geology and has had a great deal of experience in ground water geology work. Dr. Williams reviewed these locations with me and in the light of local geology he feels that prospects are very good for obtaining production wells at the proposed locations.

I would like to recommend therefore that Logan City embark on an initial program of pre-empting and developing the deeper groundwater resources under the City. I believe this is the most favorable way to firm up a long-term water supply. The development of the groundwater resource is moving throughout the state at a very rapid rate and available supplies are being quickly tied up. There are current applications to drill additional wells at the Fish Rearing Ponds. One competetive well drilled in these strata could completely block Logan City's future use of them. Likewise Logan City's wells would make difficult their use by others. This well water, if available, may be used for exchange at the Spring, or if not needed for that purpose could doubtless be pumped directly into the distribution system without treatment. I cannot over-emphasize the importance, in my opinion, of getting some rights in and developing what may very likely be Logan's last water hole. I would hope we could obtain at least 3 c.f.s. and perhaps 5 c.f.s. per well.

Initial Development

I have made the following tentative, unofficial estimate of cost based on the assumption that the wells would be 350 feet deep and 16 inches in diameter. I believe we should drill a test hole at locations 1 and 3. If these are satisfactory, test holes probably would not be needed at the other two locations. This estimate is not the "Engineers Estimate" to be used for the purpose of letting contracts.

6-in Test holes	2 @ 350' = 700' @ $7.00/ft	$4,900
16-in Production wells	4 @ 350' = 1400' @ $17.00/ft	23,800
Test 4 wells @ $750. Ea.		3,000
Pumps and motors, electrical connections, Pump house, measure device, discharge pipe, etc.	4 Ea @ $5500.	22,000
	Net Total	~~$53,700~~ 53,700
Engineering, Permits, Contingency, etc.	15%	~~8,555~~ ~~16,055~~ 8,055
		~~$70,755.00~~ 62,255

Following your instructions, I am proceeding with preparation of plans and specifications for this construction.

Rights-of-Way

The City now owns suitable property at all sites except Site No. 1. It is believed that property might be quite easily obtained at this site. I recommend that the City do this immediately.

Negotiation With Utah Power and Light

Use of well water in exchange will decrease the amounts of water available for power production by U.P.& L. and the University, at least in theory. As far as U.P.& L. is concerned, if we go ahead, I suggest that the Commission consider with its attorneys whether or not to approach U.P.& L. in advance regarding this matter. It may be that some favorable arrangement can be worked out. On the other hand the City might wait and see whether U.P.& L. chooses to protest the transfer, and, if they do, take appropriate action at that time. Even if U.P.&L. was paid damages for the power lost, I do not believe this would be a major expense. I cannot speak officially for the University, but, I believe they have an interest in this problem which is greater than the theoretical loss of power involved at the State Dam and would not place obstacles in the way of this project.

Geological Assistance

Procurement of professional geological advice and assistance would seem to be quite urgent on the basis of the magnitude of the project and the risks involved in underground work. I feel this is very important and could easily save considerable money in well construction. Furthermore, availability of a geologist thoroughly familiar with the logs of the wells and their relation to local geology would be most helpful in the event of interference lawsuits. I have discussed this matter unofficially with Dr. Williams. He would render such service which would include assistance in location, inspection and evaluation of the drillings, assistance on contract documents and inspection of construction, recommendations on perforations, and construction design and methods and would assist in defense against interference protests and suits. His retainer for the four wells would be $500.

Engineering Services

I have discussed this with A. A. Bishop. While I am scheduled to go overseas on June 15, Mr. Bishop will be

available after that so we can render the necessary service. We would be happy to continue on the present time-spent arrangement if you wish, however, I believe our professional position would be better if we were to accept a percentage fee. We would agree to include retainer of the geological expert at our expense in case we went on this basis. We would propose to prepare all necessary plans, specification and contract documents, prepare necessary filings, location surveys, inspect and supervise construction, and prepare final plans and report complete for the wells, equipment and housing. Our proposed fee would be 7 percent of the net total construction cost which is in accordance with standard fee schedules for this magnitude of work.

BISHOP AND PETERSON

Dean F. Peterson

DFP/bp

D.M.A.D. COMPANY

DELTA, UTAH

N. S. BASSETT, Secretary

April 27, 1961

Dr. Dean F. Peterson, Dean
School of Engineering
Utah State University
Logan, Utah

Dear Dean:

Enclosed you will find specifications for the drilling of a 16" O. D. irrigation well.

You will note that the specifications call for the Owners to furnish the pipe necessary to drill the well. Our reason for doing this on the one well was because of the steel strike and it was necessary for us to protect the driller. This provision is highly undesirable and only as a last resort would I use it. It is readily understandable that for any reason the well driller might choose, either rightfully or wrongfully, he can blame and use as an excuse, faulty pipe. Where if he furnishes the pipe and it is solely his responsibility less trouble is apt to occur.

If we may be of further assistance to you, please let us know.

Sincerely yours,

N. S. Bassett

N. S. Bassett

Mr. Wayne D. Criddle
State Engineer
405 State Capitol
Salt Lake City, 14, Utah

Dear Mr. Criddle:

In connection with our applications for well appropriations Nos. 32, 883; 32,884; 32,885; 32,886, reference is made to your notice of protest dated May 24 1961 transmitting several protests and to subsequent protests totalling 35. These protests are listed on the attached tabulation.

(in number)

We do not believe that any of these protests are based on valid grounds for the following reasons:

Of 35 protestants, 30 (all except Nos. 5, 18, 32, 33, 34) are in connection with wells apparently in Young Ward. We feel that the proposed wells will not interfere for the following reasons:

(Two, Nos. 33 and 34, are in College Ward)

1. Isopiestic maps of the ground water aquifers tapped by these wells show conclusively that the origin of the water (serving these wells) is definitely from ~~streams to~~ the south, not from the Logan River drainage.

2. These wells are generally 5 miles or more distant from the nearest proposed well. This should be well outside the reasonable zone of influence of the proposed wells, even if they tapped the same stratum.

3. These wells are generally not deeper than 100 to 200 feet and therefore tap much shallower strata different from the strata (below 250' depth) which Logan City proposes to tap.

With regard to possible interference with wells owned by River Heights (No. 5), these wells penetrate strata at least 150 feet above those which Logan City proposes to develop. They are on the opposite side of and near to Logan River and probably obtain their supplies by rather direct recharge from Logan River. Unless the whole aquifer in this area were homogeneous and unstratified, which would preclude artesian pressure and which is not the case, it is almost impossible that interference could occur. Mayor Olsen has not protested the drilling of the Logan City wells, but has only asked for an evaluation.

With regard to protestant Carson, No. 18, this well is one and one-half miles away. It doubtless penetrates much shallower sediments than those which Logan City proposes to penetrate.

With regard to pretestant Pinder, apparently for Logan River and Blacksmith Fork Irrigation Co., on the grounds that springs and return drainage to the river above their diversion will be dried up, this seems inconceivable. It is impossible to imagine that these shallow drainages could have any hydraulic connection with the deep strata Logan City proposes to penetrate.

Based on the above information, we feel that our applications should be approved without durther delay.

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Mayor, Logan City

8. Orson W. Wilson	Rte 1 Logan, Ut.	Culinary well No. 31820. I cannot find this in the Sections within and adjacent to Logan City. How far away is it. He implies that he lives some destance from Logan.
9- D. Ilworth Young	Rte 1 Logan, Utah.	Think Logan should develop surface storage. Culinary well A29306. How far from the proposed wells is this well located.

Protestant	Location	
① Floyd V. Israelsen	Young Ward. Rte 1, Bx 184 Logan, Utah	Claims culinary and animal use of flowing wells. No reference is made to any specific appropriation. No information is given as to depth of wells, These wells must be several miles away from the nearest proposed well if not much farther. These wells are already drying up. What is there depth and location?
② Lorin Coleman (Logan River and Black-Smith Fork Irrig. Co)	RFD #1 Logan Utah	No reference is made to any specific appropriations. Uses flowing wells for culinary purposes.
③ Willard K. Hill	RFD #1 Logan, Utah.	Eight wells, Six irrigation, 2 culinary These wells are in S6 T12R1E at least 3 miles away from the proposed wells. Depth or appropriation numbers are not stated.
④ Norman J. Olsen	RFD # 1 Logan, Utah	Culinary well # A23877. I do not find this in S32, 33, 34, 27, 28 Tp 12 or S 3, Tp 11 so it must not be very close. 35 4,5
⑤ Heber Olsen - River Heights Town.	River Heights	Not a definite protest; only if State Engineer finds interference. #1 is 12/14" 192' located on bench in River Heights immediately So of Logan R. #2 is 12½" - 140' deep. Both penetrate strata far above those proposed by Logan City.
⑥ Frederick N. Lloyd	RFD #1 Logan.	Culinary well in Young Ward. Doesn't say how far away or how deep.
⑦ Russell Williams	RFD #1 Logan.	Says located in Sec 6 491. Doesn't say how far away or how deep.

October 10,1961

Mr. Muril Osborne:
Technical Services Inc.,
292 West Center Street
Provo, Utah

This will instruct you to proceed with construction of a production well at Site No. 3 in accordance with the specifications which are part of the contract between Logan City and Technical Services, Inc. Permission is granted to remove the casing from the 3rd test well at this site and to construct the production well in that hole. It is understood that this permission in no way amends or modifies the basic contract, by implying any liability on the part of the owner for the success or failure of this particular method of construction, or otherwise.

It is our intent to issue a change order permitting use of a 20" casing for the first section of the production hole and this letter also constitutes notice of such intent.

BISHOP AND PETERSON

cc: Commissioner Winget
City Engineer
Technical Services, Inc.

October 10,1961

Mr. Muril Osborne:
Technical Services Inc.,
292 West Center Street
Provo, Utah

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It is our intent to issue a change order permitting use of a 20" casing for the first section of the production hole and this letter also constitutes notice of such intent.

BISHOP AND PETERSON

cc: Commissioner Winget
City Engineer
Technical Services, Inc.

October 10, 1961

CHANGE ORDER NO. 1
to
CONTRACT FOR EXPLORATORY DRILLING
AND WATER SUPPLY WELLS
LOGAN, UTAH

Technical Services, Inc.
292 West Center Street,
Provo, Utah

Gentlemen:

Reference is made to your contract with Logan City for drilling exploratory wells and construction of water supply wells dated July 10, 1961. In this connection you are directed, as required by the Engineer, to begin construction of the production wells using 20-in. diameter casing of weight and quality satisfactory to the Engineer and in accordance with the general intent of the specifications. This casing shall be extended to such depth as agreed to by the Engineer in consideration of your recommendations.

It is agreed that compensation will be at the bid price per foot for 16-in. casing plus the actual cost to the contractor for the extra shoe required for each well and the increased size of casing. Certified copies of vendor's invoices to support these increased costs shall be included in regular requests for payment submitted in accordance with the specifications.

BISHOP AND PETERSON

Dean F Peterson

October 10, 1961

Approved for Logan City

R C Angle
City Engineer

Dec. 6, 1961

Technical Services, Inc.
292 West Center Street
Provo, Utah

Gentlemen:

You are hereby authorized to reduce the size of the casing from 16" to 12" for drilling the production well below a depth of 394' and to proceed with drilling until ordered to stop by the engineer.

BISHOP AND PETERSON

Bishop

December 15, 1961

Mr. Duane Jensen
Technical Services, Inc.
Logan, Utah

Dear Mr. Jensen:

As per our conversation of December 13 you may discontinue drilling at approximately 465 feet depth. Please plug off the bottom of the well with a cement plug approximately 6 feet long and perforate as follows, with full-size perforations approximately 1/2" X 6".

Depth	Perforations per Ft.	Perforated Length
315-325	12	10
325-335	Blank	0
335-365	12	30
365-375	Blank	0
375-385	12	10
385-395	Blank	0
395-420	8	25
420-440	8	20
		95 feet

Please then surge and bail until the well is clean. After you have sealed off the joints where the pipes reduce you may proceed with the pump test. It is intended that the well be pumped to full capacity for at least 48 hours.

Sincerely yours,

DTP

PETERSON & BISHOP
Engineers